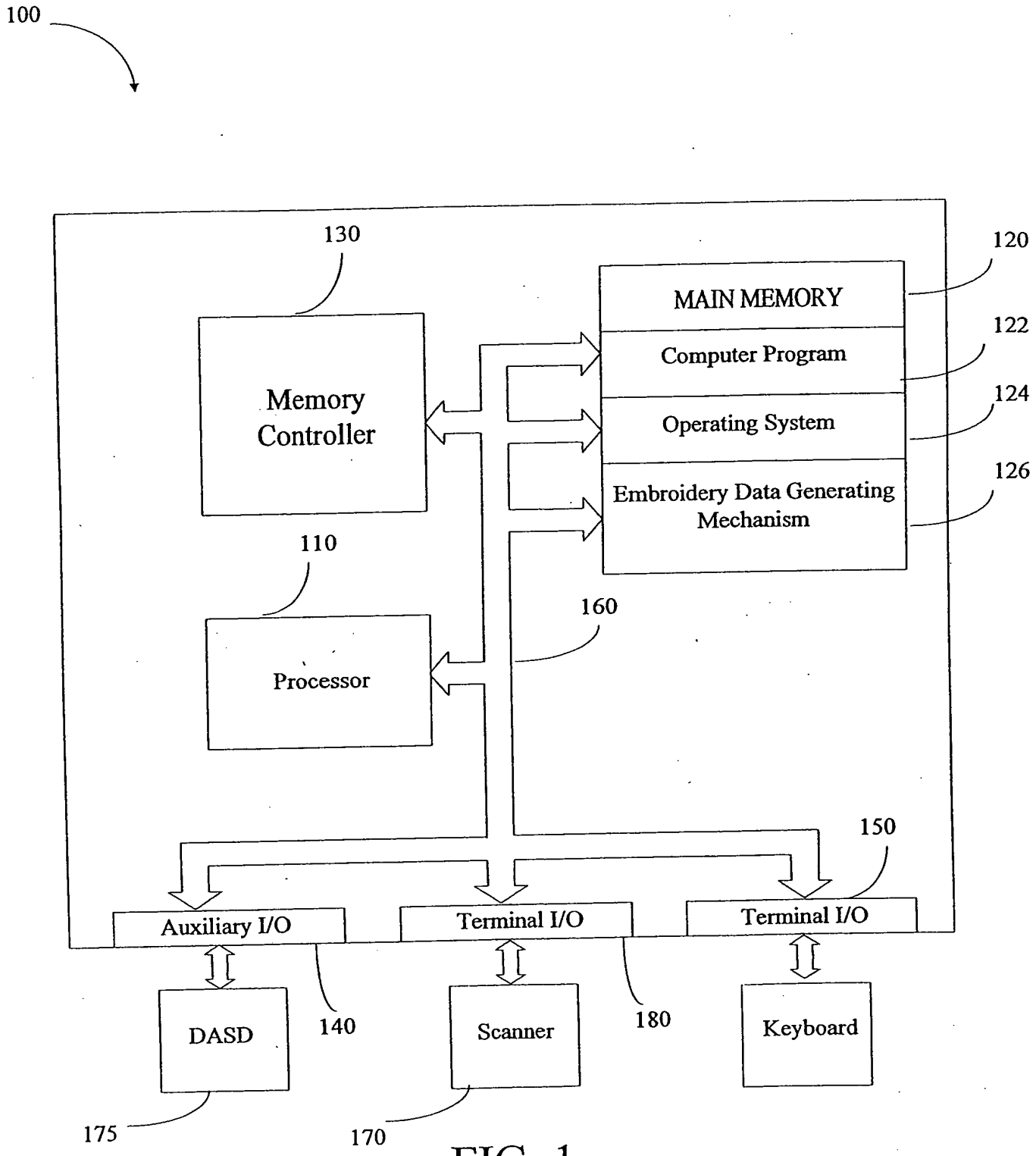
100
130
120
MAIN MEMORY
Memory Controller
122
Computer Program
124
Operating System
126
Embroidery Data Generating Mechanism
110
160
Processor
150
Auxiliary I/O
Terminal I/O
Terminal I/O
DASD
140
Scanner
180
Keyboard
175
170

FIG. 1

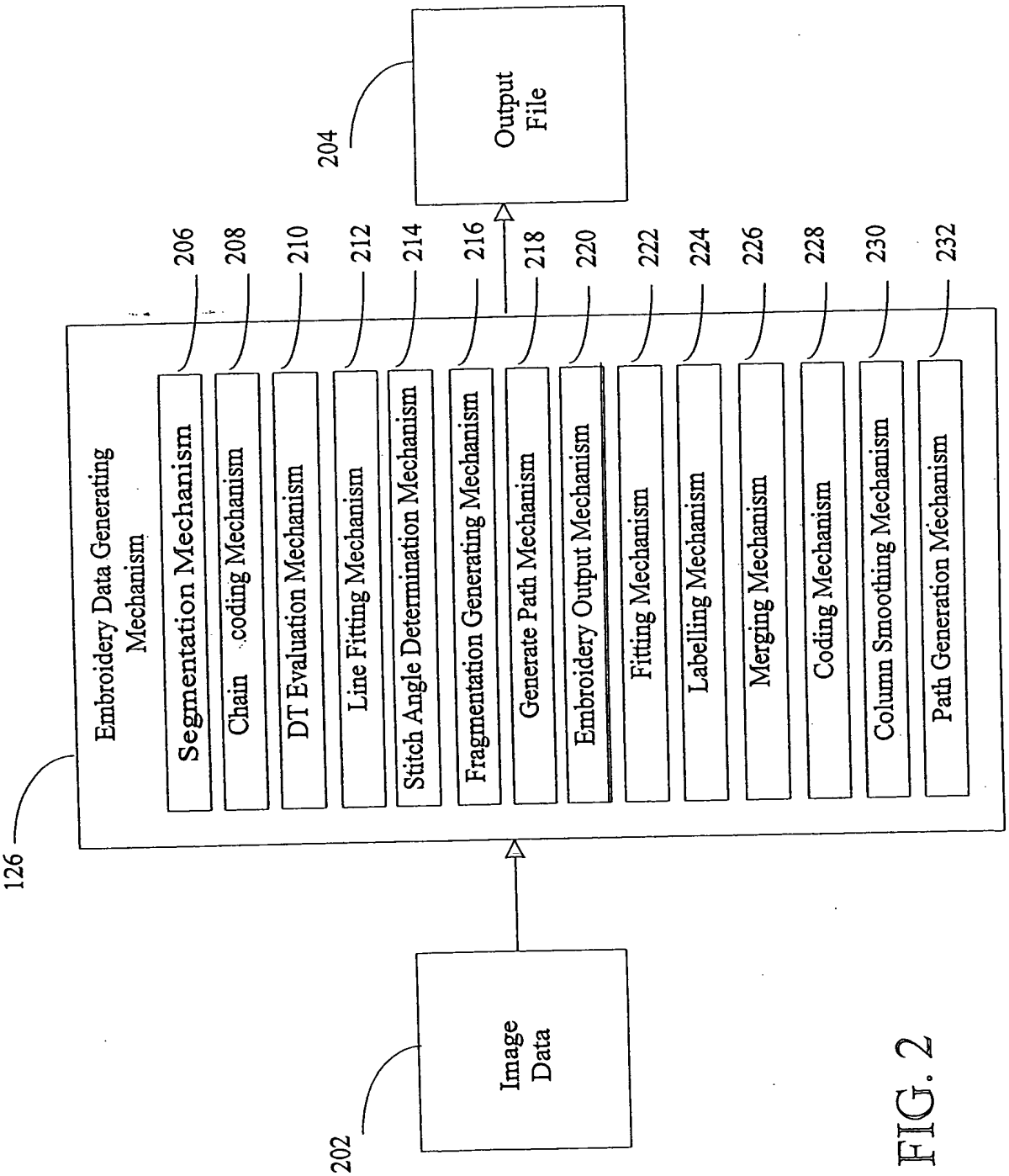
Image Data
202
Output File
204
126
Embroidery Data Generating Mechanism
206
Segmentation Mechanism
208
Chain coding Mechanism
210
DT Evaluation Mechanism
212
Line Fitting Mechanism
214
Stitch Angle Determination Mechanism
216
Fragmentation Generating Mechanism
218
Generate Path Mechanism
220
Embroidery Output Mechanism
222
Fitting Mechanism
224
Labelling Mechanism
226
Merging Mechanism
228
Coding Mechanism
230
Column Smoothing Mechanism
232
Path Generation Mechanism

FIG. 2

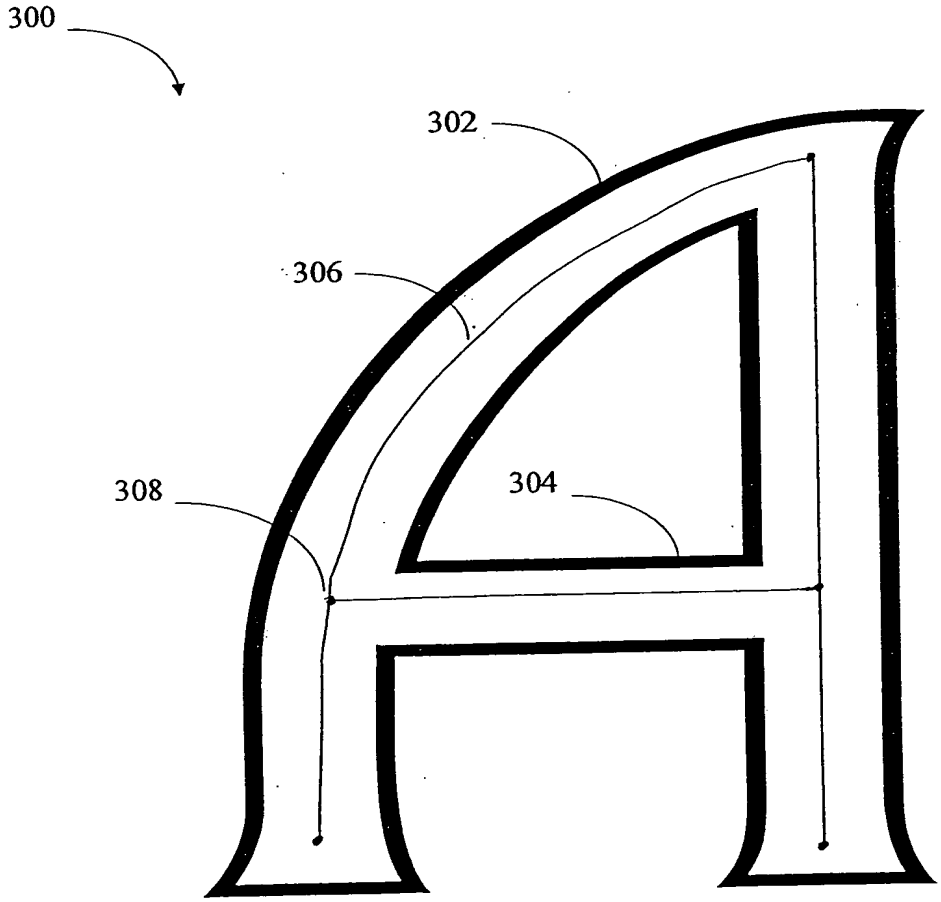

FIG. 3

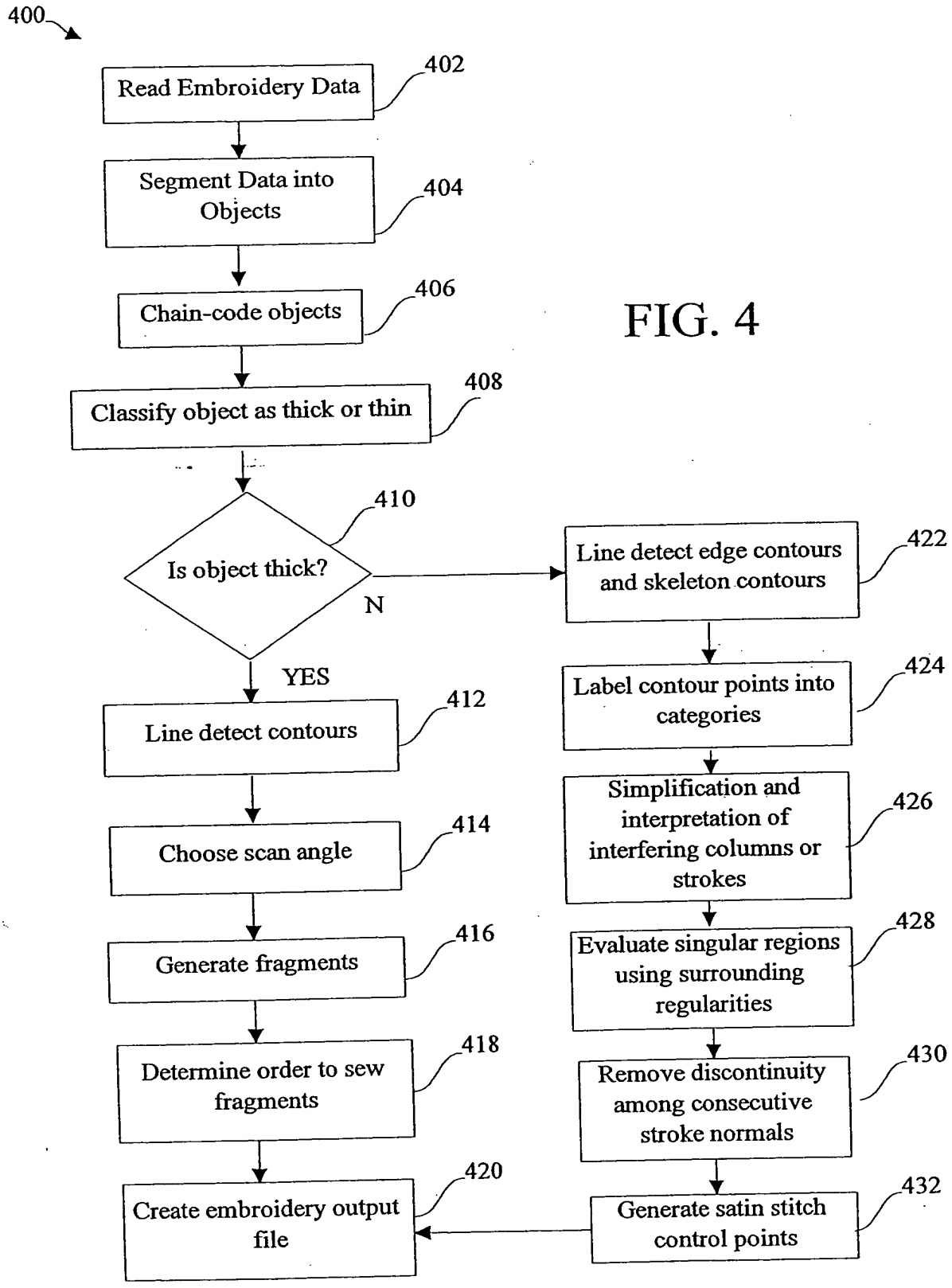
400
Read Embroidery Data
402
Segment Data into Objects
404
Chain-code objects
406
Classify object as thick or thin
408
Is object thick?
410
N
YES
Line detect edge contours and skeleton contours
422
Label contour points into categories
424
Simplification and interpretation of interfering columns or strokes
426
Evaluate singular regions using surrounding regularities
428
Remove discontinuity among consecutive stroke normals
430
Generate satin stitch control points
432
Line detect contours
412
Choose scan angle
414
Generate fragments
416
Determine order to sew fragments
418
Create embroidery output file
420

FIG. 4

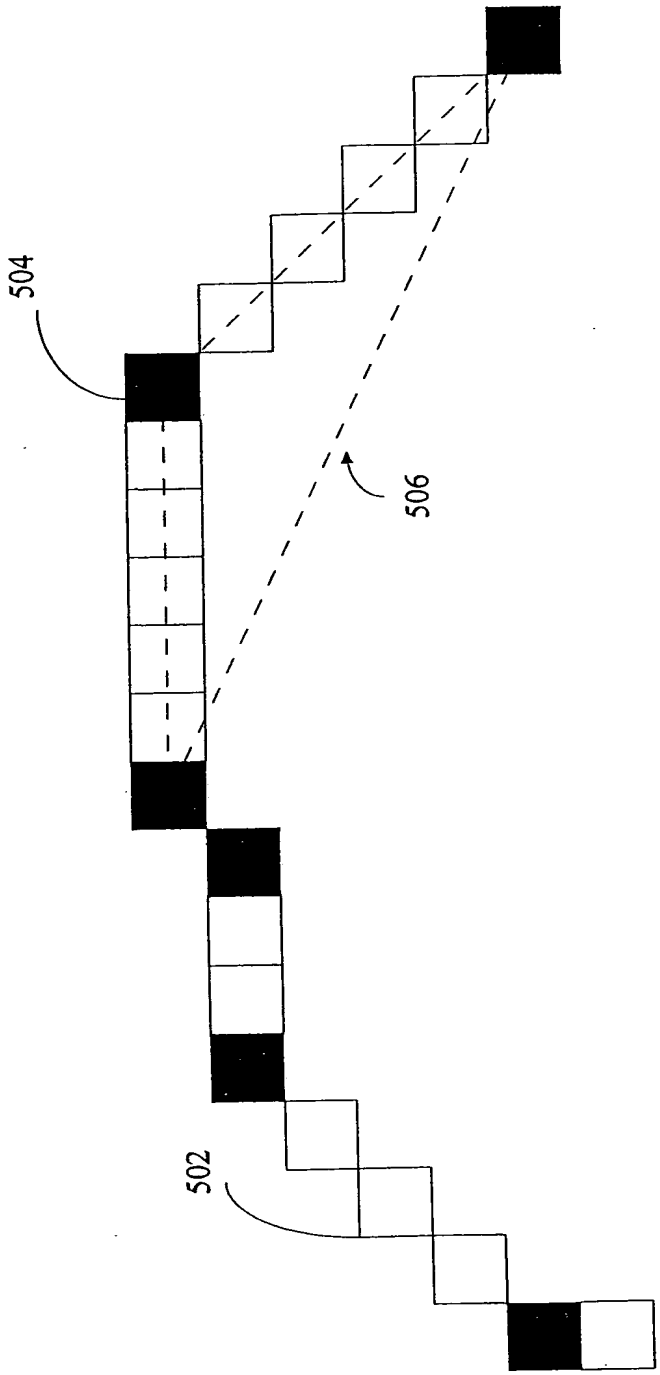

FIG. 5

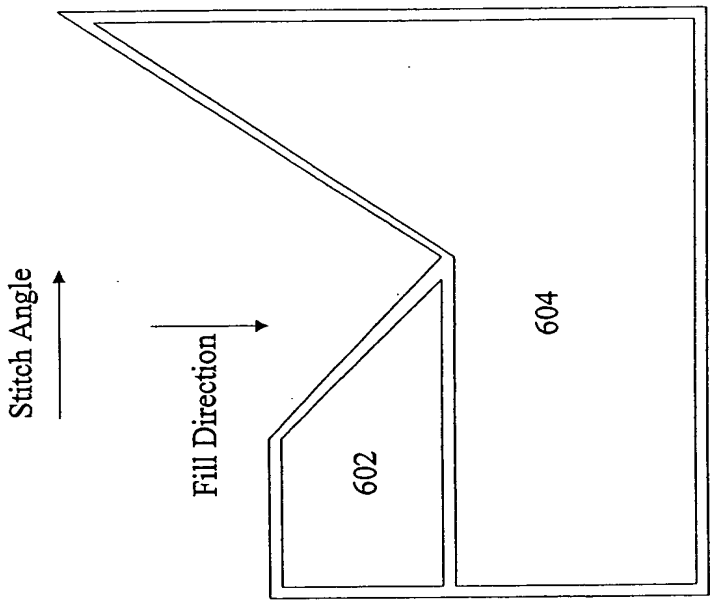

FIG. 6a

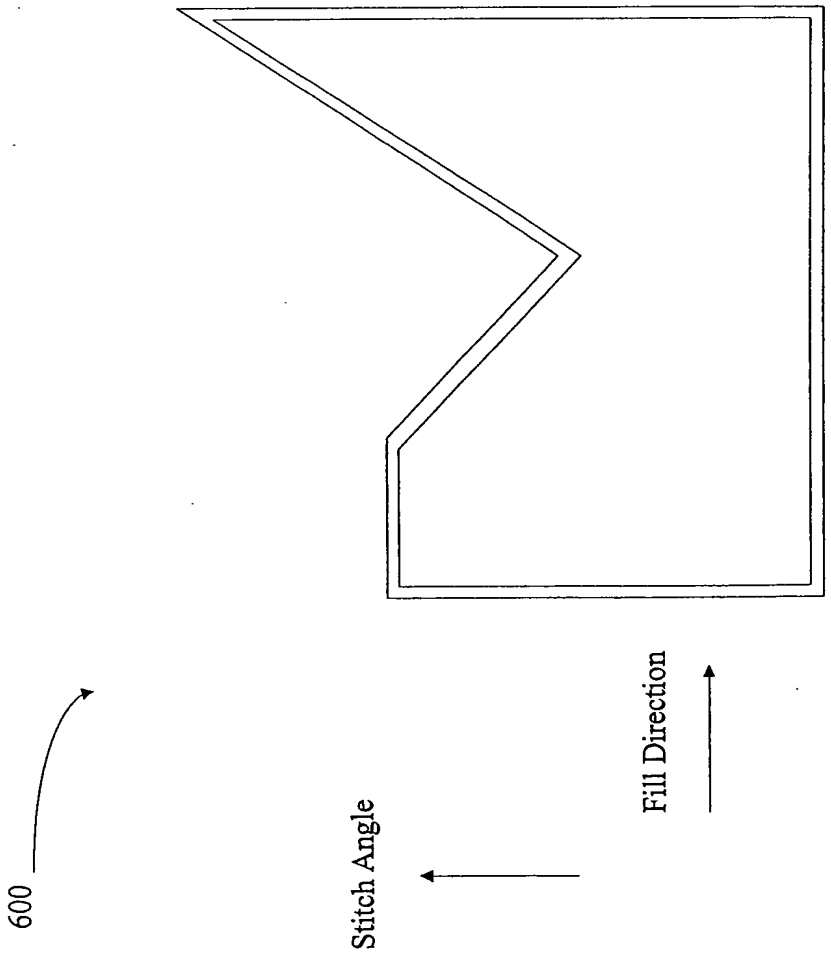

FIG. 6b

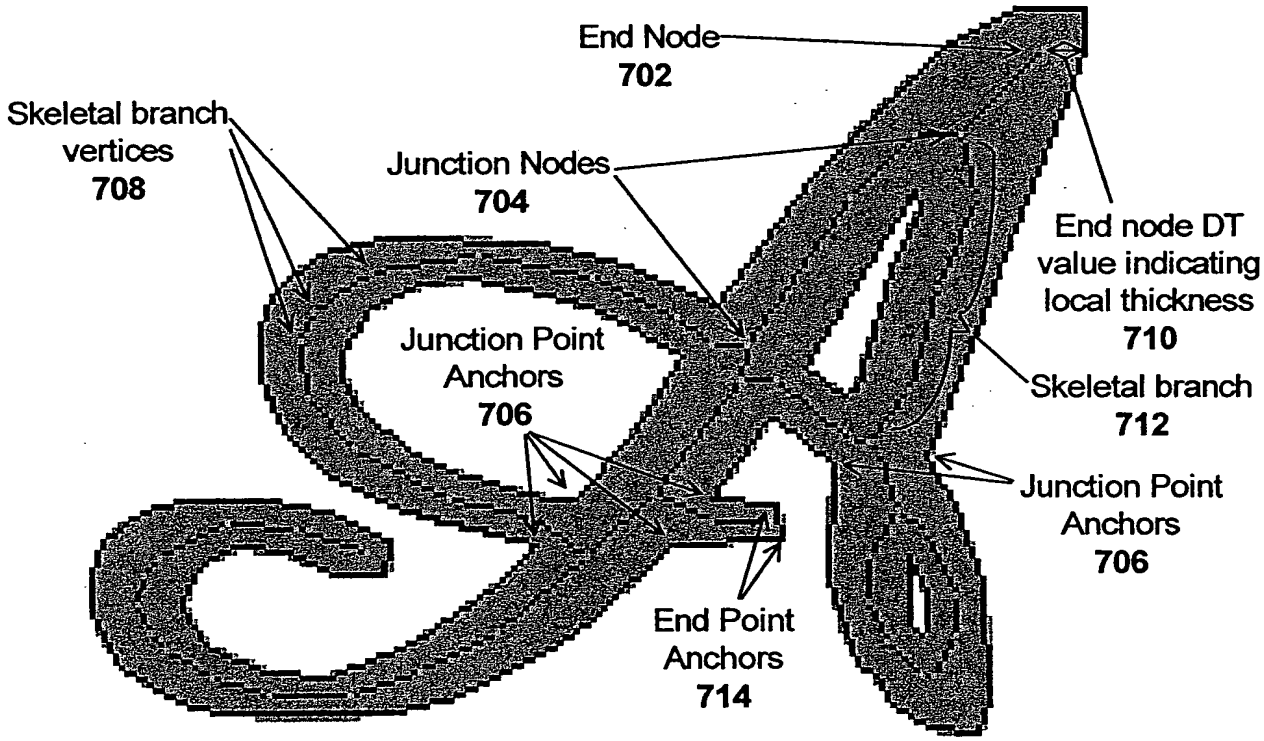
End Node
702
Skeletal branch
vertices
708
Junction Nodes
704
End node DT
value indicating
local thickness
710
Junction Point
Anchors
706
Skeletal branch
712
Junction Point
Anchors
706
End Point
Anchors
714

FIG. 7.

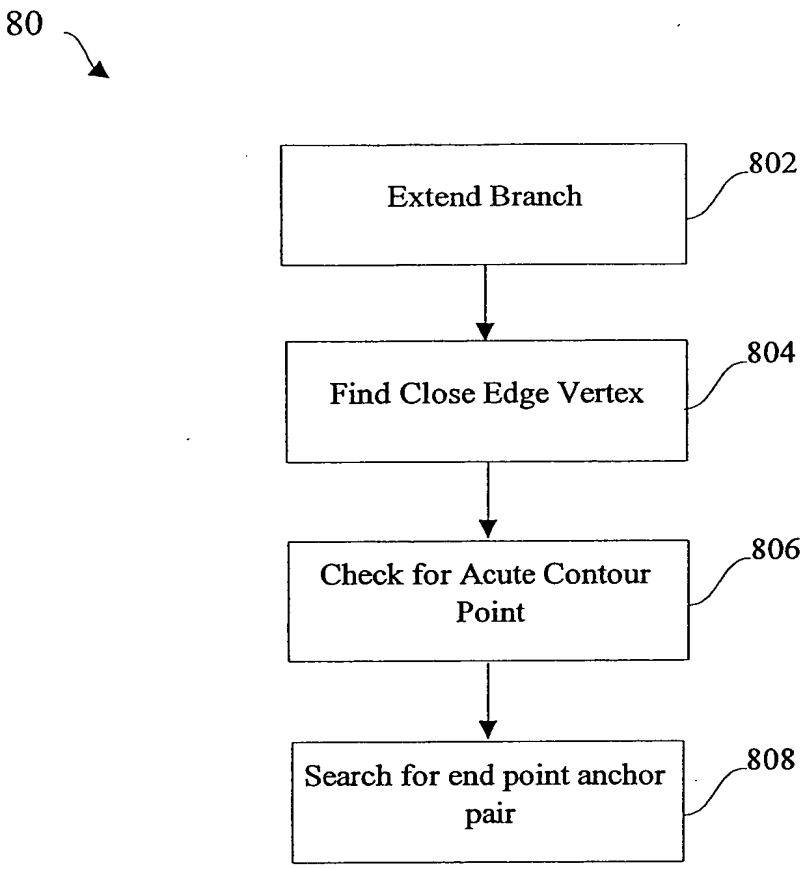
80
Extend Branch
802
Find Close Edge Vertex
804
Check for Acute Contour Point
806
Search for end point anchor pair
808

FIG. 8

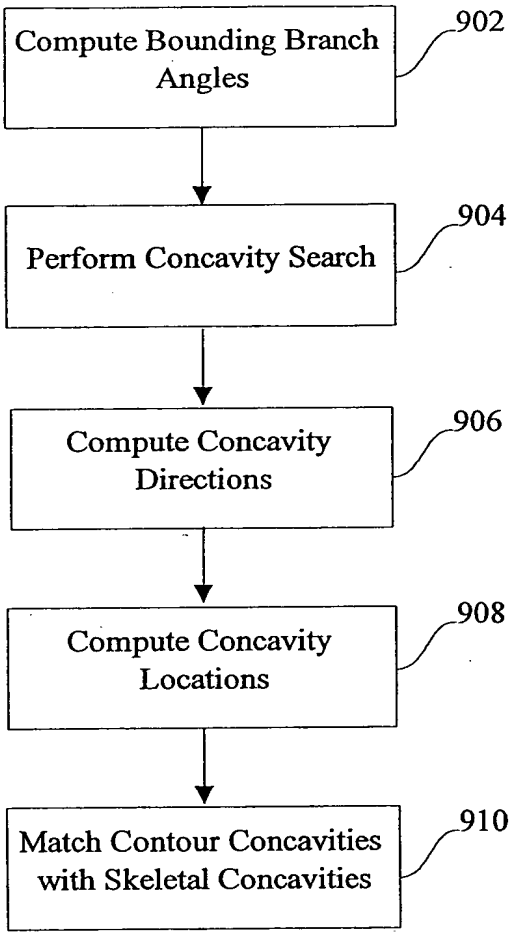
Compute Bounding Branch Angles
902
Perform Concavity Search
904
Compute Concavity Directions
906
Compute Concavity Locations
908
Match Contour Concavities with Skeletal Concavities
910

FIG. 9

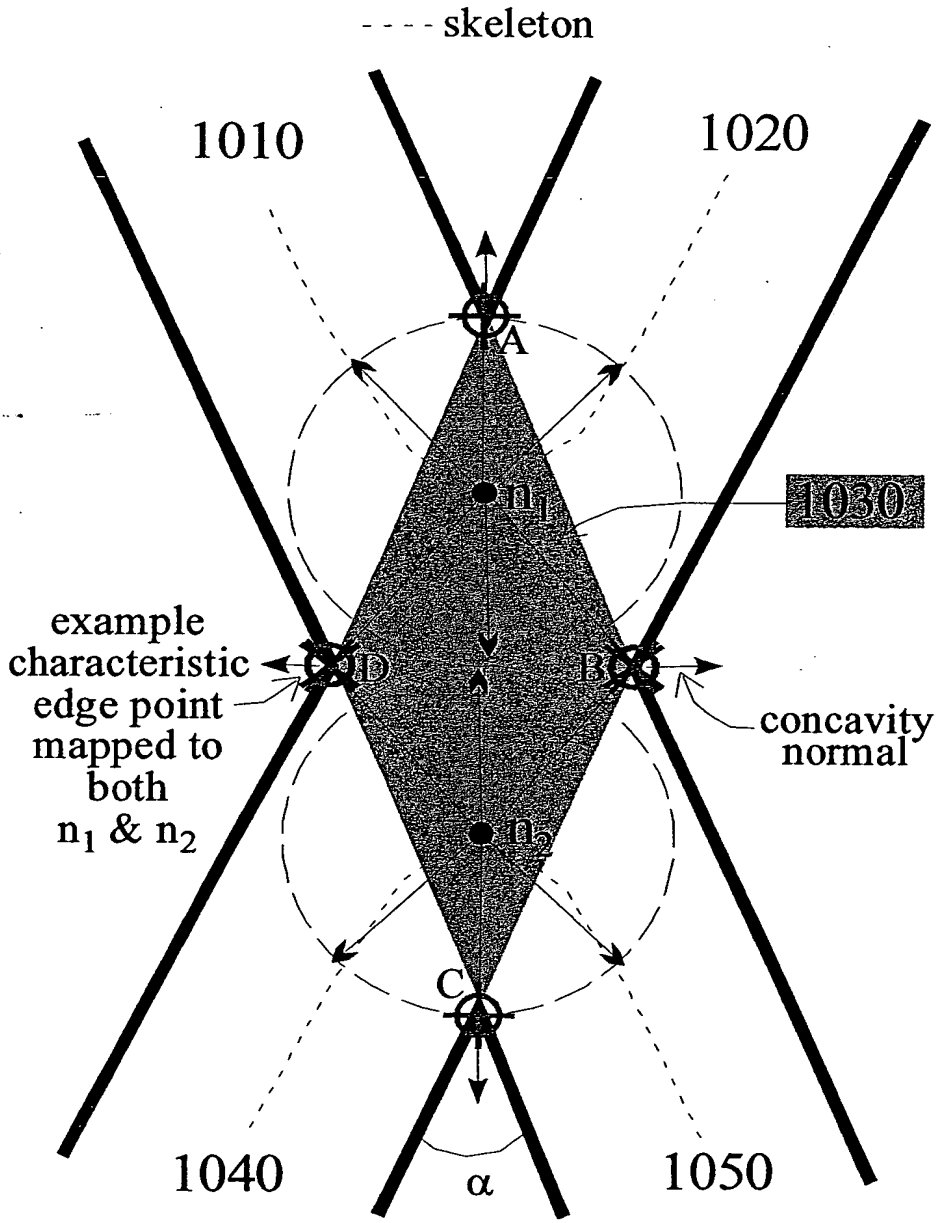
skeleton
1010
1020
A
n_1
1030
example characteristic edge point mapped to both n_1 & n_2
D
B
concavity normal
n_2
C
1040
α
1050

FIG. 10.

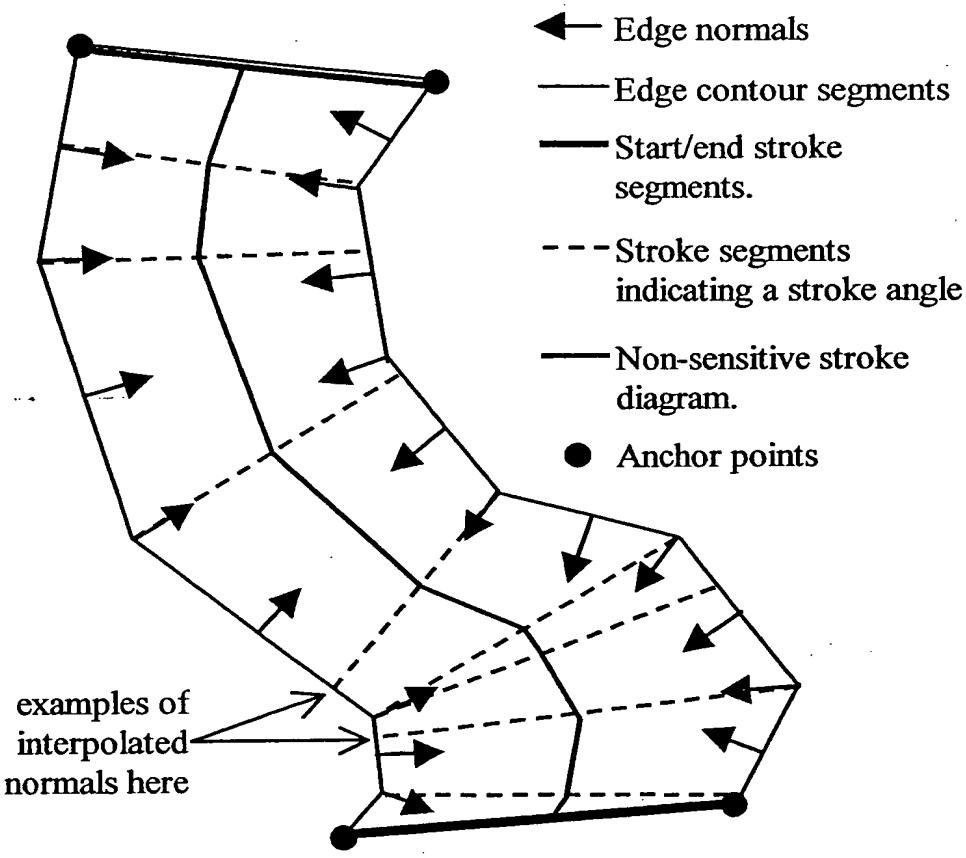
Edge normals
Edge contour segments
Start/end stroke segments.
Stroke segments indicating a stroke angle
Non-sensitive stroke diagram.
Anchor points
examples of interpolated normals here

FIG. 11.

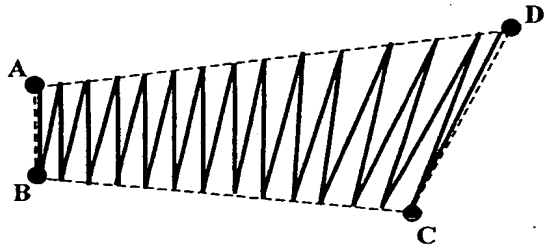

FIG. 12a.

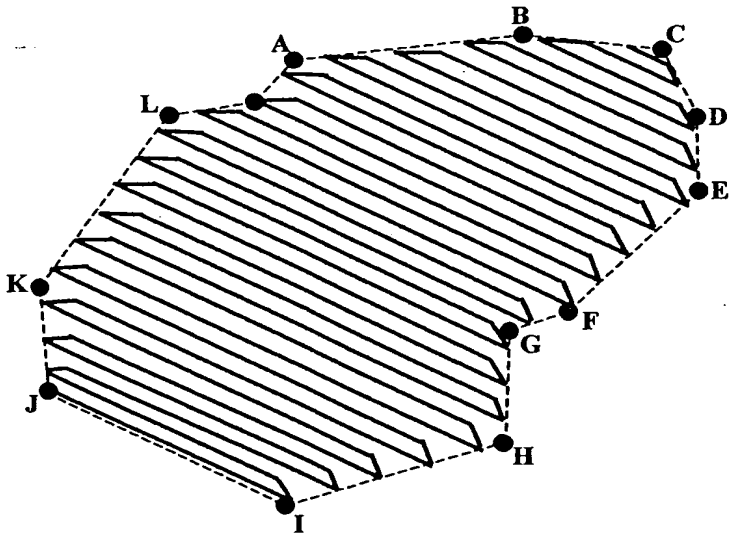

FIG. 12b.

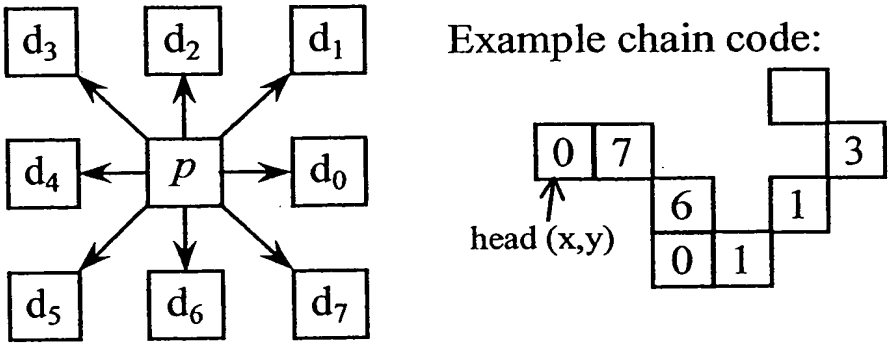

FIG. 13.

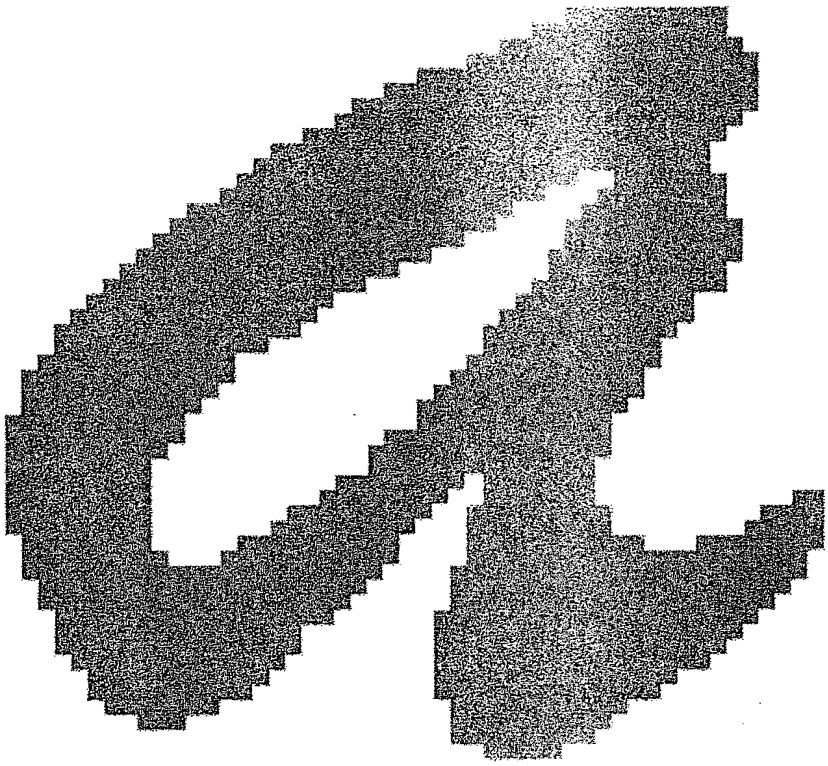

FIG. 14a.

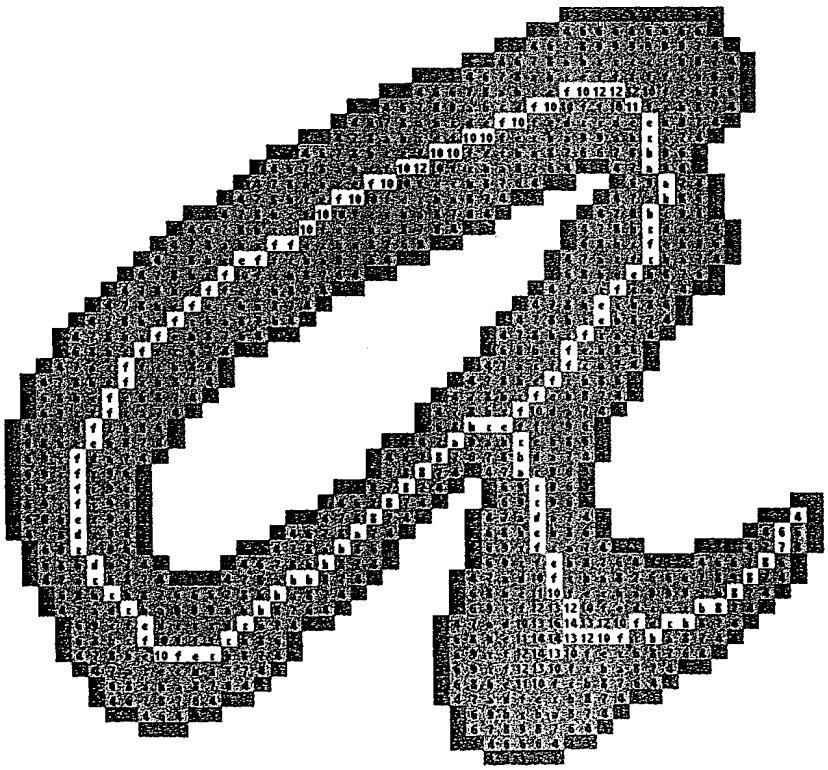

FIG. 14b.

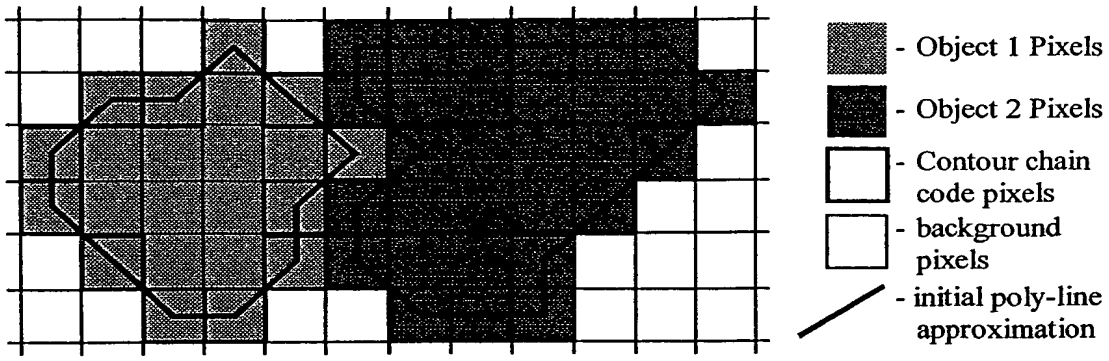

FIG. 15a.

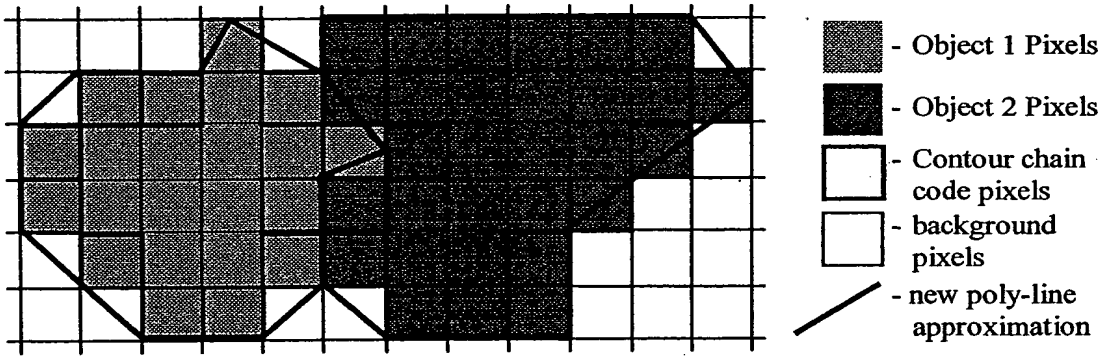

FIG. 15b.

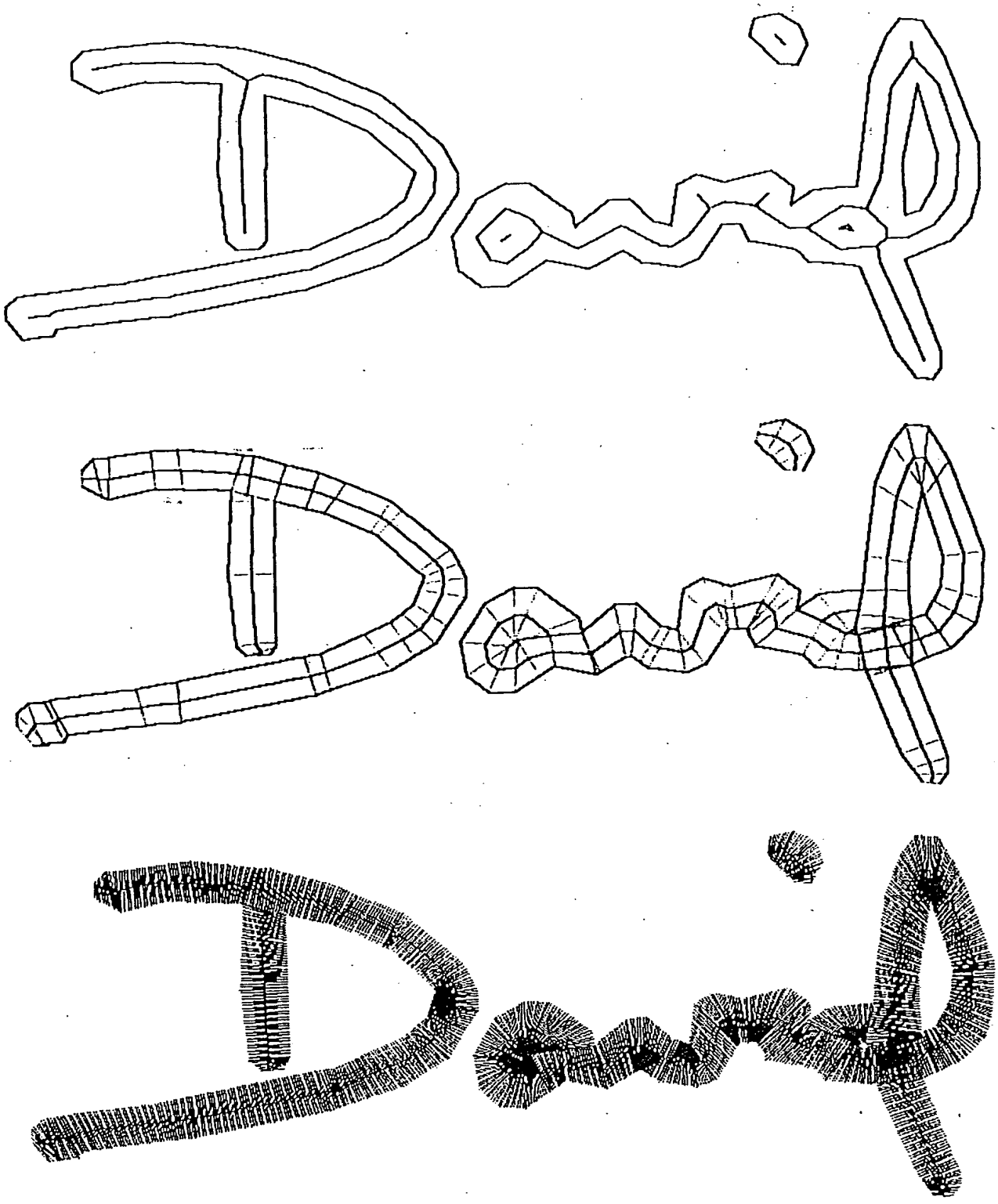

FIG. 16